



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,524	10/12/2006	Helene Audrain	PB60434USw	8612

23347 7590 11/29/2007

GLAXOSMITHKLINE
CORPORATE INTELLECTUAL PROPERTY, MAI B475
FIVE MOORE DR., PO BOX 13398
RESEARCH TRIANGLE PARK, NC 27709-3398

EXAMINER

SMITH, JENNIFER A

ART UNIT	PAPER NUMBER
----------	--------------

4116

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

11/29/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USCIPRTP@GSK.COM
ROSALIE.M.CHAMBERLAIN@GSK.COM
JULIE.D.MCFALLS@GSK.COM

Office Action Summary	Application No. 10/567,524	Applicant(s) AUDRAIN ET AL.	
	Examiner Jennifer A. Smith	Art Unit 4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 1 and 12-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/07/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

Applicant's election without traverse to prosecute the subject matter of Group II, Claim 11 in the reply filed on 10/16/2007 is acknowledged. Claims 2-10 have been amended to read upon 11.

Claims 1 and 12-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected subject matter, there being no allowable generic or linking claim. Claims 1 and 12-17 have been cancelled. Election was made **without** traverse in the reply filed on 10/16/2007.

Claims 2-11 are presented for examination.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in the UK on 08/08/2003.

Information Disclosure Statement

The information disclosure statement filed 02/07/2006 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all

other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Objections to the Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Process for preparing radiolabelled compounds by carbonylation using radiolabelled H_3BCO .

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 3-7, 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lidstrom et al. (J. Chem. Soc., Perkin Trans. 1, 1997) in view of Alberto et al. (J. Am. Chem Soc., 2001).

The instant claim 11 is drawn to a process for preparing radiolabelled compounds by carbonylation using H_3BCO as a donor of radiolabelled carbon monoxide.

The radiolabelled H_3BCO is prepared by the process contacting H_3B in a suitable solvent with radiolabelled carbon monoxide.

Lidstrom et al. teaches, in **Scheme 1**, the synthesis of [carbonyl- ^{11}C]ketones from [^{11}C]carbon monoxide. [^{11}C]carbon monoxide is present as 45-85 μm substrate, 15-45 μmol tin reagent and 1.4 μmol of the palladium complex in 300 μl NMP was used. The reaction mixture was heated for 5 min. The process of preparing radiolabelled

Art Unit: 4116

compounds by carbonylation with CO is therefore known. However, Lidstrom fails to teach H_3BCO as the donor of radiolabelled carbon monoxide.

Alberto et al. found that by preparing H_3BCO from commercially available $\text{H}_3\text{B-THF}$ and reacting it in situ with an alcoholic solution of potassium hydroxide, $\text{K}_2[\text{H}_3\text{BCO}_2]$ could be produced at ambient pressures. This result was achieved by controlling the equilibrium of the two-way reaction between H_3BCO and H_3BTHF by selectively condensing the THF out of the reaction. The resultant $\text{K}_2[\text{H}_3\text{BCO}_2]$ was then used as an in situ source of CO in aqueous solution and as a reducing agent. [Page 3135, Paragraph 4]. H_3BCO is an intermediate in this process and is formed prior to the $\text{K}_2[\text{H}_3\text{BCO}_2]$. Therefore, the process of preparing H_3BCO is known.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Lidstrom's teaching in view of Alberto because it is well known in the art that radiolabelled H_3BCO can be used to release radiolabelled carbon monoxide in organic solvents, aqueous solvents and mixtures of organic and aqueous solvents in order to prepare radiolabelled compounds without the need for high pressure autoclaves or recirculation units. One would have been motivated to make such a modification because existing methods for the trapping of $[^{11}\text{C}]$ carbon monoxide for the production of radiolabelled compounds rely on the use of high pressure or recirculation of $[^{11}\text{C}]$ carbon monoxide to maintain adequately high levels of $[^{11}\text{C}]$ carbon monoxide in solution. This requires the use of dedicated automated robotic systems for the handling

Art Unit: 4116

of [^{11}C]carbon monoxide and specialized equipment. Borane carbonyl (H_3BCO) is the immediate precursor to boranocarbonates, such as the potassium salt $\text{K}_2[\text{H}_3\text{BCO}_2]$ which were reported to release CO in water at elevated temperatures.

Claims 3 and 4 are drawn to the process of claim 11 wherein the production of radiolabelled H_3BCO is promoted by the removal of free solvent from the mixture by condensation.

Alberto et al. teaches, in **Page 3135, Column 2, lines 10-14**, the key to the preparation is the control of the equilibrium between H_3BCO and $\text{H}_3\text{BCO THF}$. THF is selectively condensed from the gas stream at $-50\text{ }^\circ\text{C}$, while H_3BCO (bp $-64\text{ }^\circ\text{C}$) passes on, carried by a stream of carbon monoxide.

Claim 5 is drawn to the process of claim 11 wherein the solvent used in the production of radiolabelled H_3BCO comprises an ether or tetrahydrofuran.

Claim 6 is drawn to the process of claim 11 wherein the solvent used in the production of radiolabelled H_3BCO comprises a diethyl ether or tetrahydrofuran.

Claim 7 is drawn to the process of claim 11 wherein the solvent used in the production of radiolabelled H_3BCO is tetrahydrofuran.

Alberto et al. teaches, in **Page 3135, Column 2, lines 10-14**, THF (tetrahydrofuran) as the solvent for the reaction.

Claims 9 and 10 are drawn to the process of claim 11, wherein the carbon monoxide is radiolabelled with ^{11}C .

Lidstrom et al. teaches, in **line 1 of Abstract**, “[^{11}C]Carbon monoxide has been used in the synthesis of [carbonyl ^{11}C]ketones.

Therefore claims 3-7, 9-11 are obvious and not patentably distinct over the prior art of the record.

Claims 2, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lidstrom et al. (J. Chem. Soc., Perkin Trans. 1, 1997) in view of Alberto et al. (J. Am. Chem Soc., 2001) and further in view of Carter et al. (J. Am. Chem Soc., 1965).

Claim 2 is drawn to the process of claim 11, additionally the radiolabelled H_3BCO is prepared in the presence of a suitable base. Claim 8 is drawn to the process of claim 1 wherein the base is triethylamine, N-Methyldibutylamine, M-Methyl-2,2,6,6-tetramethylpiperidine or N,N-di-isopropyl-ethylamine (DIPEA).

Lidstrom et al in view of Alberto et al. teaches the process of claim 11 as evidenced by the above rejection. Carter et al. teaches the preparation of H_3BCO . On **Page 2355, Column 2, Paragraph 1**, Carter teaches a tri-methylamine base, a functional equivalent to triethylamine. It would have been obvious to one of ordinary skill to prepare the radiolabelled H_3BCO in such a base because it further enhances the products stability since H_3BCO strongly dissociates at room temperature.

Therefore claims 2 and 8 are obvious and not patentably distinct over the prior art of the record.

Conclusion

Claims 1, and 12-17 are cancelled.

Claims 2-11 are rejected.

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Smith whose telephone number is 571-270-3599. The examiner can normally be reached on Monday - Friday, 8:30am to 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Application/Control Number: 10/567,524

Page 9

Art Unit: 4116

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer A. Smith
November 14, 2007
TC 4116

JS

/Vickie Kim/
Supervisory Patent Examiner, Art Unit 4116